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	199 31 415.2	8 July 1999 (08.07.1999)	199 42 076.9	3 September 1999 (03.09.1999)
	199 31 418.7	8 July 1999 (08.07.1999)	199 42 079.3	3 September 1999 (03.09.1999)
	199 31 419.5	8 July 1999 (08.07.1999)	199 42 086.6	3 September 1999 (03.09.1999)
	199 31 420.9	8 July 1999 (08.07.1999)	199 42 087.4	3 September 1999 (03.09.1999)
	199 31 424.1	8 July 1999 (08.07.1999)	199 42 088.2	3 September 1999 (03.09.1999)
	199 31 428.4	8 July 1999 (08.07.1999)	199 42 095.5	3 September 1999 (03.09.1999)
	199 31 434.9	8 July 1999 (08.07.1999)	199 42 124.2	3 September 1999 (03.09.1999)
	199 31 435.7	8 July 1999 (08.07.1999)	60/187,970	9 March 2000 (09.03.2000)
	199 31 443.8	8 July 1999 (08.07.1999)		US
	199 31 453.5	8 July 1999 (08.07.1999)		
	199 31 457.8	8 July 1999 (08.07.1999)		
	199 31 465.9	8 July 1999 (08.07.1999)		
	199 31 478.0	8 July 1999 (08.07.1999)		
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	199 31 541.8	8 July 1999 (08.07.1999)		
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	199 31 592.2	8 July 1999 (08.07.1999)		
	199 31 632.5	8 July 1999 (08.07.1999)		
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	199 31 636.8	8 July 1999 (08.07.1999)		
	199 32 125.6	9 July 1999 (09.07.1999)		
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	199 32 130.2	9 July 1999 (09.07.1999)		
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	199 32 228.7	9 July 1999 (09.07.1999)		
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[Continued on next page]

(54) Title: *CORYNEBACTERIUM GLUTAMICUM GENES ENCODING METABOLIC PATHWAY PROTEINS*

(57) Abstract: Isolated nucleic acid molecules, designated MP nucleic acid molecules, which encode novel MP proteins from *Corynebacterium glutamicum* are described. The invention also provides antisense nucleic acid molecules, recombinant expression vectors containing MP nucleic acid molecules, and host cells into which the expression vectors have been introduced. The invention still further provides isolated MP proteins, mutated MP proteins, fusion proteins, antigenic peptides and methods for the improvement of production of a desired compound from *C. glutamicum* based on genetic engineering of MP genes in this organism.

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- *With international search report.*
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- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 00/00923

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C12N15/31 C12N15/61 C12N1/21 C12N9/90 C07K14/34
 C12P13/08 C12Q1/68
 //((C12N15/61,C12R1:15)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C12N C07K C12P C12Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, EMBL, BIOSIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>KEILHAUER C ET AL: "ISOLEUCINE SYNTHESIS IN CORYNEBACTERIUM GLUTAMICUM: MOLECULAR ANALYSIS OF THE ILVB-ILVN-ILVC OPERON" JOURNAL OF BACTERIOLOGY, US, WASHINGTON, DC, vol. 175, no. 17, 1 September 1993 (1993-09-01), pages 5595-5603, XP000611312 ISSN: 0021-9193 the whole document</p> <p>---</p> <p>-/-</p>	1-3, 8-19, 22-34

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

° Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
31 October 2000	24.01.01
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl. Fax: (+31-70) 340-3016	Authorized officer Galli, I

INTERNATIONAL SEARCH REPORT

International Application No

PCT, IB 00/00923

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DATABASE EMBL SEQUENCES [Online] Accession No. 033231, 15 December 1998 (1998-12-15) COLE S.T.: "Diaminopimelate epimerase (DAPf) of Mycobacterium tuberculosis." XP002151647 52% identity at amino acid level with Seq. ID 2. -& COLE S.T. ET AL.: "Deciphering the biology of Mycobacterium tuberculosis from the complete genome sequence." NATURE, vol. 393, 1998, pages 537-544, XP002151645 ---	6-17,37, 38
A	BATHE B. ET AL.: "A physical and genetic map of the Corynebacterium glutamicum ATCC13032 chromosome." MOL. GEN. GENET., vol. 252, 1996, pages 255-265, XP002151646 the whole document, in particular table 3. ---	1-38
A	EP 0 435 132 A (KERNFORSCHUNGSSANLAGE JUELICH) 3 July 1991 (1991-07-03) the whole document ---	1-38
A	EIKMANN B J ET AL: "MOLECULAR ASPECTS OF LYSINE, THREONINE, AND ISOLEUCINE BIOSYNTHESIS IN CORYNEBACTERIUM GLUTAMICUM" ANTONIE VAN LEEUWENHOEK,DORDRECHT,NL, vol. 64, no. 2, 1993, pages 145-163, XP000918559 figure 1 -----	1-38

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB 00/00923

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.: because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Claims 1-38 Partially.

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
 No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-38, partly

An isolated nucleic acid molecule from *Corynebacterium glutamicum* encoding a metabolic pathway protein or a portion thereof, said nucleic acid being characterized by sequence ID 1. An isolated nucleic acid comprising a nucleotide sequence at least 50% homologous to seq. 1. Corresponding polypeptides (Seq. ID 2). Corresponding vectors, recombinant host cells, production methods. Use in diagnosis of *C. diphtheriae*.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PC., iB 00/00923

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0435132	A 03-07-1991	DE 3943117 A DE 59006837 D	04-07-1991 22-09-1994